I. INTRODUCTION

PURPOSE OF THE STATE DROUGHT PLAN

The purpose of this plan is to provide Montana with the framework for an effective and systematic response to the impacts of drought on its people and resources. To this end, the plan prescribes long-term measures to anticipate and prevent drought impacts, and short-term measures intended to mitigate drought impacts. The Montana Drought Plan also:

1) identifies the local, state, and federal agencies and private sector entities involved with state drought management, and defines their responsibilities;

2) defines a process to be followed: monitoring, reporting, assessment, and response, and;

3) identifies a number of long-term and short-term activities that can be implemented to prevent and mitigate drought impacts.

DEFINING DROUGHT

For purposes of this plan, drought is an extended period of below normal precipitation which causes damage to crops and other ground cover; diminishes natural stream flow; depletes soil and subsoil moisture; and because of these effects, causes social, environmental, and economic impacts to Montana. Identifying the point at which drought begins and ends is difficult because physical water supply and moisture conditions translate into different consequences for natural resources and various economic activities.

GUIDING PHILOSOPHY

In the past, the state addressed drought as a temporary emergency. Actions were taken in response to impacts, in a reactionary fashion. The most important lesson learned in recent years was that the best time to reduce the impacts of drought is before they occur. It was not until quite recently that western water planners were able to develop plans that advocated a proactive drought management approach. The Montana drought statute was framed with this approach in mind.

Drought conditions present a variety of problems for water users. In addition to diminished water supplies, legal and practical obstacles hinder timely changes in water allocation during drought. These obstacles often preclude solutions that call for the redistribution of water supplies to places where there is a water deficit. Drought exposes difficulties in the enforcement of water rights, particularly in river basins that have yet to be adjudicated. Furthermore, there is a lack of incentives that encourage water conservation. Given these circumstances, the best approach the state can adopt is to warn water users of impending problems and encourage them to implement conservation measures in advance of drought.

"Proactive" Emphasis

Planning holds great promise for reducing the impacts of drought, which occurs with greater warning and frequency than other kinds of disasters. This plan is based on the idea that with foresight, commitment, technology, and today's knowledge, more can be done to reduce the effects of drought. For example, improvements in drought forecasting methods can enable water users to plan future water use accordingly and mitigate drought impacts in advance of deteriorating water supply and moisture conditions.

The ability to forecast a drought in the short-term is not as good as we would like, but it is improving. From experience we know that some situations present a high likelihood of drought in the near future. For instance, if western Montana has a dry fall resulting in low soil moisture, followed by a low snowfall winter, it is reasonable to expect summer streamflow will be below normal.

Local Emphasis

Montana is too large and its climate too diverse for state government to coordinate all drought management activities. Concerns west of the Continental Divide may not be a problem east of the divide. Even if these two regions of the state have similar drought problems, their responses are likely to be different. The state's role in drought management is to implement a drought policy that provides coordination and technical support for local efforts in a timely fashion.

Much responsibility for drought mitigation rests with the individual, followed by local cooperative action, and state and federal assistance. Although drought often impacts the entire state economy, drought impacts are most significant at the local level where most knowledge and experience to deal with these impacts is found. The most effective responses are planned and implemented by local people with the assistance of government.

Long-term and short-term activities

Preparation for drought should be an ongoing activity to effectively mitigate the impacts of drought when it occurs. Therefore, this plan is organized to address two specific types of activities: 1) short-term, or immediate activities to address a specific imminent impact of drought, and 2) long-term, or ongoing activities that address the certainty that drought will occur sometime in the future.

II. BACKGROUND

The following section provides a brief history of drought in Montana and the circumstances and events leading up to the adoption of the legislation that established the state drought advisory committee.

HISTORY OF DROUGHT PLANNING IN MONTANA

The drought of the 1930's was exacerbated by poor farming practices, low market prices and a depressed economy. Impacts on Montana and across much of the Great Plains were severe. A variety of adjustments ensued: improved farmland management, the establishment of insurance programs, liberalization of credit, and diversification of the regional economy. As a result, impacts caused by the drought of the 1950's were much less severe than those of the 1930's, even though the conditions were similar to those of the dust bowl era of the 1930's. Still, state government's role in mitigating drought impacts was relatively minor.

From 1976 through the present, Montana has endured a period largely characterized by years of below average precipitation, punctuated by the extremely dry years of 1977,1987-88, 1992, and 1994. Montana's first state drought plan was published in 1985 and revised in 1988. These plans were useful primarily for coordinating emergency responses to drought and providing lists of people in state government to contact for help with specific drought-related problems. The plan provided "triggering mechanisms" or thresholds, that were supposed to lead to specific actions by state agencies, but when those thresholds were exceeded, the prescribed response actions were rarely implemented in a timely or effective manner.

The responsibility for the failure of drought plans to achieve identified goals lies less with the plans than with decision-makers who lacked the resolve to implement elements of the plans. Much of this has to do with the psychology of drought management. While it is known that drought will occur again, measures that would lessen our vulnerability to drought in the long and short-term are often overlooked or dismissed. Similarly, while in the midst of a drought, it is certain that someday rains will return and the state will have survived drought once again. This attitude causes people to delay doing the sometimes difficult things that could lessen detrimental impacts of drought in the short-term.

MONTANA STATE WATER PLAN

Dissatisfied with the state's response to the 1985, 1986, and 1988 droughts, the public requested that drought management be addressed by the state water plan process. A steering committee of broad representation made several recommendations to improve state drought management based on the policy statement of the plan section:

It is the policy of the state of Montana to support proactive drought management at the local level to protect the natural resources, economic base, and lifestyles of Montana citizens. This policy requires programs for drought monitoring, assessment, preparedness, mitigation, and assistance.

The state must consider the needs of all water users during drought, including dryland and irrigated agriculture; municipal and rural water suppliers; energy producers; mining and mineral processing; forest products, tourism, recreationists, and recreation-based businesses; and individual water users. Incentives should be provided for all water users to act to prevent or reduce the effects of drought. State technical and financial assistance should be provided to water users in a consistent and predictable manner. Water users should consider the risks posed by drought when making major management decisions and should know what to expect from government if drought occurs.

The steering committee offered numerous recommendations concerning the following issues:

1) Drought Monitoring and Early Warning
2) Impact Assessment
3) Coordination of Governmental Actions
4) Triggering Mechanisms
5) Assistance Programs
6) Funding for Drought Management Programs
7) Research and Educational Programs
8) Drought Mitigation Strategies

The recommendations of the drought steering committee are listed, by issue, in the Appendix of this plan.

One of the most important recommendations of the steering committee was to create a permanent drought advisory committee. House Bill 537, passed by the legislature in 1991, established the Montana Drought Advisory Committee and defined its responsibilities (See Appendix).

MONTANA'S CLIMATIC DIVERSITY

State actions to mitigate drought impacts vary due to Montana's diverse topography and precipitation regimes. Annual precipitation ranges from 6 inches in the southcentral prairies to 120 inches in the northwest mountains. The mountainous regions of the state receive 55 to 80 percent of annual precipitation between October and April. Most of this precipitation is snow that is stored as snowpack until spring runoff. Records indicate that in years when snowpacks are below normal by March 1st, and soil moisture levels are low, streamflows most likely will be low in coming months.

In contrast, the eastern two-thirds of the state, which is primarily characterized by prairie topography, receives 55 to 65 percent of its annual precipitation between April and August. The prairie dryland farming regions must receive spring and summer rains to avert the impacts of drought. Drought mitigation management for this region consists primarily of conservation farming practices, use of drought-resistant grain varieties, and participation in programs that preclude land from production such as the Conservation Reserve Program (CRP).

Drought impacts related to surface water shortages can often be mitigated by changes in water management practices. Adjustments of water management during drought can be effective in mountainous regions of the state that are dependent on mountain snowpack runoff for irrigation. This approach will hold true for central and eastern regions of the state that depend on irrigation water from rivers and reservoirs fed by snowmelt from nearby and distant mountain ranges. Reliable water supply forecasts for irrigation and instream flows can be made early for runoff-dependent regions of the state in contrast to dryland farming regions, which depend on timely precipitation to provide soil moisture for crop growth.

III. STRUCTURE AND FUNCTION

The following section presents the structure and function of the organizations dealing exclusively with drought-related issues at the state and local level. It also includes a table listing the state and federal agencies that support the DAC with data used for forecasting and assessing drought conditions.

MONTANA DROUGHT ADVISORY COMMITTEE

Section 2-15-3308 MCA (1991) established the Montana Drought Advisory Committee (DAC) and delegated staff duties to the Department of Natural Resources and Conservation (DNRC). Subsection (2) states:

> "The drought advisory committee is chaired by a representative of the governor and consists of representatives of the departments of natural resources and conservation; agriculture; commerce; fish, wildlife, and parks; military affairs; health and environmental sciences; state lands; and livestock. The governor's representative must be appointed by the governor and the representative of each department must be appointed by the head of that department. Additional non-voting members who represent federal and local government agencies and public and private interests may also be appointed by the governor." Subsection (3) sets forth the responsibilities of the committee. *The committee shall:*
>
> *(a) with the approval of the governor, develop and implement a state drought plan;*
> *(b) review and report drought monitoring information to the public;*
> *(c) coordinate timely drought impact assessments;*
> *(d) identify areas of the state with a high probability of drought and target reporting and assistance efforts to those areas;*
> *(e) upon request, assist in organizing local drought advisory committees for the areas identified under subsection (3)(d);*
> *(f) request state agency staff to provide technical assistance to local drought advisory committees; and*
> *(g) promote ideas and activities for groups and individuals to consider that may reduce drought vulnerability.*

The statute calls for meetings of the DAC in February and October to assess drought conditions, identifies DNRC as the agency responsible for providing staff support, and requires a status report describing the potential for drought in the coming year to the governor by March 15 of each year. Section 2-15-3308 MCA in full can be found in Appendix F.

Committee Meeting Procedure

Statute requires that Drought Advisory Committee (DAC) meetings are held, ... "at a minimum, on or around the 15th day of the months of October and February of each year to assess moisture conditions and, as appropriate, begin preparations for drought mitigation (Sec. 2-15-3308 MCA 1991)." A meeting in February provides the DAC with an opportunity to review initial projections regarding spring and summer surface water supplies for irrigated agriculture, instream uses, and reservoir storage. Projections are possible by assessing mountain snowpack, soil moisture, carryover reservoir storage, and weather forecasts. An October meeting provides an opportunity to report season end conditions and to summarize the state's response over the preceding months.

Additional DAC meetings are held monthly, or as needed to correspond with the release of federal and state agency status reports. If conditions or circumstances warrant, the chairperson may call a special meeting of the DAC to address specific issues. The chairperson may elect not to hold meetings other than those required by statute, if water supply and soil moisture conditions are near average or above. A water supply meeting of the agencies that monitor conditions may be called in lieu of a monthly meeting of the full committee.

The DAC may hold meetings in March and/or April to report changes in mountain snowpack since February, and to provide an updated projection of summer surface water supplies. March and April are important months for monitoring and forecasting future water conditions. Forecasts of spring and summer water supplies for mountainous river basins can change dramatically between February and April. Normally, mountain snowpack has reached its seasonal peak by mid-April in most of the state. The NRCS releases a *Montana Basin Outlook Report* on April 1, projecting streamflow probabilities for the 15 major river basins of the state based on snowpack.

An April DAC meeting can assist resource managers, water resource-based businesses, agricultural producers, and others in making informed decisions regarding water management activities for the coming season. Initial plans for reservoir operations, irrigation scheduling, and hydropower generation are formulated at this time. An April meeting provides the public and technical committee members with an opportunity to interpret water supply projections and management plans.

DNRC is responsible for providing the chairperson with current information so informed decisions can be made, such scheduling a DAC meeting. Meetings should be held if the drought indices indicate moderate drought or, if an **"Alert"** status exists for more than one area of the state.

Most DAC meetings should be held in Helena at a location that is accessible to the members of the committee and the general public, including the handicapped. The meeting room should be large enough to accommodate the foreseeable attendance. Regular meetings require 2 to 3 hours for reporting and discussion, but may vary in length.

A portion of each DAC meeting is used to report on drought conditions. Each state or federal member of the DAC reports on its respective area of responsibility and expertise. In the event an agency representative cannot attend, the chair should be notified and arrangements made for a substitute. If this is not possible, DNRC can deliver the report to the DAC on behalf of that agency. Supporting documents should be forwarded to DNRC for distribution at the meeting.

The meeting agenda is prepared by DNRC with approval of the chairperson. DNRC ensures that there are enough copies of the agenda for all attendees. Copies of all documents distributed at the meeting shall be made available to anyone requesting them.

Committee Reporting Procedure

Each agency member should present a 10 to 15 minute report; exclusive of questions and answers. The order of reporting by agencies that report water supply and moisture conditions is as follows:

	Reporting Agency	Subject
1)	NWS	Temperature and precipitation, forecasts
2)	NRCS	Mountain snowpack, precipitation
3)	USGS	Streamflow
4)	Reclamation	Reservoir levels (federal)
5)	DNRC	Reservoir levels (state) Fire conditions
6)	USFS	Fire conditions

Following water supply and moisture condition reports state member agencies present assessment reports. Next, responses are explored during a period set aside for general discussion. The chairperson conducts the discussion period and entertains motions from voting members that require a vote. Questions for agencies should be directed through the chairperson. Recommendations concerning assessment or response actions should be addressed by the full committee during this period.

Members of the general public may address the committee during the discussion period, upon recognition by the chairperson. The meeting is not adjourned until those guests wishing to address the committee have had an opportunity to do so. When the chairperson is satisfied that the committee's business has been concluded, the meeting is adjourned.

LOCAL DROUGHT ADVISORY COMMITTEES (LDACs)

The drought statute emphasizes local organization and response to drought and requires that the state, upon request, provide assistance to local governments for drought mitigation. First, the state will identify areas of the state with a high probability of drought and target reporting and assistance efforts to those areas. Next, the state will suggest organizing local drought advisory committees for those areas. The statute further requires that by March 15, the state report the potential for drought to the governor and identify the areas of the state for which the creation of LDACs is advisable.

Structure

An LDAC should include participants from a wide variety of backgrounds and professions. Participants with experience in drought response and from businesses directly affected by drought can be particularly helpful. Topics for LDACs to consider include domestic and municipal water supply, fire suppression, agricultural water use, limitations on sewage discharge, and impacts to fish and wildlife, recreation, tourism, and energy use.

LDACs serve as a focal point for the exchange of information between the DAC and counties. LDACs are encouraged to submit regular reports of local conditions and impacts to the DAC. This can be done by mail, telephone, FAX, or by sending a representative to DAC meetings. An LDAC can request state or federal assistance through the DAC chairperson or staff. A local drought operations manual is included in Appendix G to assist in organizing local drought management efforts.

Function

Generally, LDACs Function much the same as the state DAC. Primary activities of LDACs include monitoring, reporting, assessment, and response. LDACs begin to meet as early as mid-winter to begin discussing local conditions and review soil moisture and snowpack data collected by state and federal agencies. All water supply data used by the DAC is available upon request by LDACs to assist in local planning efforts. Most LDACs begin to meet in response to a recommendation from the governor's office. The governor's recommendation is triggered by the **"Alert"** status, which comes in advance of drought, in time to prepare for its impacts.

LDACs prepare for drought during spring by identifying beforehand, actions to take in response to worsening conditions. LDACs are advised to seek local expertise with knowledge of local resources at the first indications of drought. Planning should be initiated early enough for an LDAC to reach consensus on responses appropriate for a given level of drought. Planning for situations in advance increases the likelihood that a response will be timely in minimizing economic or resource loss. Additionally, LDACs should engage in long-term activities to be prepared for drought. DAC staff will

arrange support for water conservation education, preparation of water use ordinances and public service announcements, and technical support for municipal water supply issues.

DATA SUPPORT PROVIDED TO DAC

A number of federal and state agencies collect meteorologic and hydrologic data for use in assessing and forecasting water supply and soil moisture conditions. These data are reported to the DAC agencies for use in making impact assessments. The agencies and subject areas are listed below:

Reporting Agency	Data Reported
1) NWS	Soil moisture, precipitation, forecasts
2) NRCS	Mountain snowpack, precipitation
3) USGS	Streamflow
4) Reclamation	Reservoir levels (federal)
5) DNRC	Reservoir levels (state) Fire conditions
6) MSU, NWS	Soil moisture conditions
7) Montana Agricultural Statistics	Weather, soil moisture, crop information

In addition to reporting current conditions, monitoring agencies compare current and projected conditions with historic averages so committee members can place current conditions in context with past years. After April 1, the chairperson requests drought impact assessments by state agencies. DNRC will invite experts to address the DAC on special topics to promote awareness and to assist the DAC in making decisions.

FUNDING

No special compensation is provided to state member agency representatives serving on the DAC or to representatives of any other federal agency or private organization for expenses incurred as a result of involvement with the DAC. All costs are borne by the member agency or organization. Requests for additional emergency funding are directed through the governor's office.

Staff is responsible for procuring additional funding for state drought management as needed or as it becomes available. Staff applies for grant funding from federal sources, such as the Reclamation States Drought Emergency Relief Act of 1991, administered by the U.S. Bureau of Reclamation.

IV. DROUGHT MONITORING

Taking a proactive approach to drought management requires continuous monitoring of factors indicating the onset and extent of drought conditions. This approach serves to lessen the element of surprise and allows time for planning and implementing drought mitigation strategies. Monitoring activities are increased as conditions warrant and continue as long as drought conditions persist. Monitoring provides continuous feedback to decision-makers and helps determine the short term planning of the assessment and response functions.

MONITORING CONDITIONS

The DAC is not active from November through January. However, agencies continue to monitor conditions and provide DAC staff with data over the winter months. Particular emphasis is placed on monitoring mountain snowpacks during January, February, March, and April. Snowpack data from 15 major river basins is updated daily by the NRCS in its SNOTEL report. DNRC staff monitors Snotel data regularly to detect trends in snowpack conditions.

Two indices are important in monitoring moisture conditions. The Palmer Drought Severity Index (PDSI) measures the severity of a precipitation deficit within a given region using soil moisture data, and the Surface Water Supply Index (SWSI) projects streamflow within individual basins. Both indices are important for assessing current and future water supply conditions. They describe different, but coexistent hydrological regimes. They comprise the foundation of the "triggering mechanism" for activation of the plan's drought responses.

Palmer Drought Severity Index

The Palmer Drought Severity Index (PDSI) is an index of soil moisture based on measured precipitation, estimated evapotranspiration, and climatic characteristics. It is calculated from observed temperature and precipitation values and is most useful for evaluating conditions for prairie dryland farming and livestock grazing. The PDSI is a surrogate for actual soil moisture measurement, which is too costly to gather on the scale necessary for drought management purposes. Several agencies maintain soil moisture measuring stations and these data are used to corroborate PDSI figures at critical times.

The Montana State Climate Center calculates PDSI figures monthly for about 150 locations statewide. The values are site-specific and provide a current evaluation of soil moisture conditions. The monitoring system is operative from February 1 to September 1. The state climate center forwards the data to Natural Resources Information Systems (NRIS) located at the state library in Helena around the 10th day of the month. NRIS uses a Geographic Information System (GIS) to generate a PDSI map (See Appendix H). Completed maps are forwarded to DNRC and included in its monthly Soil Moisture and Water Supply Report. The PDSI ranges from -4 (extremely dry) to +4 (extremely wet) with a value of 0 indicating average soil moisture. The following table indicates PDSI ranges and descriptions:

Palmer Drought Severity Index (PDSI) scale

PSDI	Designation
>+4.0	Extremely wet
+3.0 to +4.0	Very wet
+2.0 to +3.0	Moderately wet
+1.0 to +2.0	Slightly wet
+0.5 to +1.0	Incipiently moist
-0.5 to +0.5	Near average
-0.5 to -1.0	Incipient drought
-1.0 to -2.0	Mild drought
-2.0 to -3.0	Moderate drought
- 3.0 to -4.0	Severe drought
<-4.0	Extreme drought

The National Weather Service (NWS) also generates PDSI figures. Figures are calculated weekly for each of seven geographic regions of the state. The NWS regional PDSI figures are useful in summarizing soil moisture conditions by region and for comparing PDSI figures generated by the state climate center. NWS reports its PDSI regional figures at DAC meetings. Changes in soil moisture levels can be monitored more frequently using NWS PDSIs than with monthly state climate center PDSIs since NWS PDSIs are updated weekly.

Surface Water Supply Index

The NRCS calculates a Surface Water Supply Index (SWSI) for individual Montana river basins based on snowpack, mountain precipitation, soil moisture, and reservoir storage. The SWSI projects streamflows for snowmelt-driven hydrologic regimes. It is particularly useful in forecasting water availability for irrigated agriculture, fisheries, and other uses of runoff water.

The calculation of the index relies on statistics generated from historic data which are collected from individual watersheds. The SWSI can be used to forecast water supplies since the water content of snowpack is stored until runoff. During runoff much of the water is stored in reservoirs and released gradually over the growing season. At the beginning of each month, NRIS receives data from the NRCS and uses them to generate SWSI map on a monthly basis February through August for DNRC's Water Supply and Moisture Condition Report (See Appendix H).

Surface Water Supply Index (SWSI)

SWSI	Designation
+3.0 to +4.0	Extremely wet
+2.0 to +3.0	Moderately wet
+1.0 to +2.0	Slightly wet
-1.0 to +1.0	Near average
-1.0 to -2.0	Slightly dry
-2.0 to -3.0	Moderately dry
-3.0 to -4.0	Extremely dry

Other Indicators of Drought

It should be noted that SWSI and PDSI values are, on the average, 2 weeks old when reported at DAC meetings. The delay is related to the time needed to prepare the water supply report. This limitation may result in the omission of data indicating current trends from consideration by the DAC. For this reason, the monitoring agencies usually provide updated information for the DAC meeting. This is especially important when the DAC is considering assigning an Alert or Severe drought status to a region of the state. Other factors to consider and the source(s) of such data are:

1) Precipitation since prior month's end; (NWS)

2) Snow water equivalent of remaining snowpacks; (NRCS)

3) Current and projected reservoir storage levels; (Reclamation, DNRC)

4) Current streamflows; (USGS)

5) Current soil moisture levels; (NWS)

6) Short-range weather forecasts (NWS)

7) Fuel moisture levels of forests; (DNRC, USFS)

8) Rate and nature of change in any of the foregoing factors;

9) Reports of livestock producers hauling water; (Agriculture, Livestock) and

10) Field observations and reports indicating drought.

REPORTING CONDITIONS

Because of the state's vast size and variety of climatic conditions, drought conditions can occur in one or two areas, while the remainder of the state is experiencing normal conditions. Likewise, conditions can quickly improve in part of the state and not elsewhere. Reporting improvements in conditions is as important as reporting deterioration of conditions.

Water supply and moisture conditions are reported in a variety ways. The USGS, NRCS, Bureau of Reclamation, NWS, and Corps of Engineers periodically issue reports concerning water supply conditions. State agencies that issue water supply and moisture condition reports include DNRC and DFWP. DNRC compiles the *Water Supply and Moisture Condition Report* from federal and state agency data (Appendix H).

Water Supply and Moisture Condition Report

DNRC compiles the *Water Supply and Moisture Condition Report* on a monthly basis, from February to October, unless above average moisture conditions are prevalent. At a minimum, the report is generated for the February and October meetings to assist the DAC in assessing the potential for drought in the coming season.

The report narratives summarize the state's weather for the previous month, the NWS 30- and 90-day forecasts, snowpack or mountain precipitation, streamflow, reservoir status, soil moisture, and drought indices. DNRC receives information from the listed agency:

Contributing Agency(s)	Subject Area
NWS	a) Weather forecasts
NRCS	b) Snowpack, mountain precipitation.
USGS	c) Streamflow
Reclamation, USGS	d) Reservoirs (federal)
DNRC	e) Reservoirs (state)
Montana Agricultural Statistics Service	f) Soil moisture
Montana Climate Center, NWS	g) Palmer Drought Severity Index
NRCS	h) Surface Water Supply Index

The following tables appear in the Report:

Table #	Data summarized
1	Snowpack and year-to-date precipitation
2	Monthly average streamflows
3	Status of Reclamation reservoirs
4	Status of state-owned reservoirs
5	Soil moisture conditions
6	Palmer Drought Severity Indices (PDSI)
7	Surface Water Supply Indices (SWSI)

Appendices in the report include:

Appendix	Topic
A	Temperature, precipitation data
B	Snow precipitation update
C	Reservoir storage data

During the reporting season, copies of the report are mailed by the 15th day of each month to the DAC, state library repositories, state agencies, professionals and interested citizens. The report is also entered on the state electronic bulletin board.

State Electronic Bulletin Board System

The state's electronic bulletin board (EBB) system provides access to the same water supply and soil moisture data used by the DAC. The data can be accessed by personal computer with a phone modem from anywhere. The user dials 1-800-962-1729, or in Helena, 444-5648, to get on the system. By typing "N", the user will access the NRIS menu. The NRIS menu will have a category for drought information. The drought file will contain snowpack, streamflow, soil moisture, weather, and reservoir data. Brief narratives assist users in interpreting data. Assessments by state agencies identify anticipated natural resource and economic impacts by region and industry. The SWSI and PDSI maps are available in graphic format for review as well.

Annual Report

An annual report summarizing the year's drought activities will be prepared. This report will include the annual summary submitted by each participating state agency. Agency reports will include assessment and response activities taken by that agency over the preceding months, a list of drought management objectives for the year, actions taken to mitigate drought impacts, and a summary of the problems encountered and successes realized by the agency.

DNRC staff will combine state agency summaries with federal agency reports into a final report of DAC activities for the year. This report will be used to review and evaluate agency responses, draft suggestions for legislative initiatives, and amend the state drought plan as needed. The final report will be used to plan agency response during future droughts. Recommendations for improving agency response will be presented and discussed at the October DAC meeting.

News Media Coverage

Public awareness is the key to mobilizing the drought impact mitigation process. To meet this goal, timely and widespread dissemination of useful information is necessary. Information on drought conditions, DAC meetings, local planning efforts, and state and federal assistance programs will receive statewide coverage to reach all of those affected by drought. News media will be invited to DAC meetings, and DNRC will periodically issue news releases.

DNRC staff will be responsible for ensuring that press, radio, and television contacts are given notice of DAC meetings. DAC agendas will be mailed to the news media and press releases will be issued by the chairperson announcing the meeting time and place. Copies of information handed out at the meetings by reporting agencies are made available to media representatives upon request and are posted on the EBB.

Press

DNRC will prepare and distribute news releases to the media. Federal agencies that provide the DAC with data are encouraged to issue their own news releases summarizing water supply and moisture conditions. In matters relating to DAC decisions or actions, DNRC will coordinate press releases with the governor's office. News releases that desribe activities of state agencies will be coordinated by DNRC and appropriate agency public relations offices.

DNRC will prepare news releases when drought conditions change, following meetings of the DAC, or any official drought-related activity of a unit of state or federal government. DNRC will be responsible for the distribution of any relevant material that accompanies news releases including maps, charts, and general information. Newspapers are encouraged to print maps indicating water supply and moisture conditions across the state.

Public Service Announcements

DNRC will work with agency representatives to develop public service announcements (PSAs) for distribution to radio and television stations to inform the public of worsening fire hazard, water shortages, water conservation efforts, official land use restrictions, and other topics relevant to drought management. PSAs in the past have featured the governor requesting that residents conserve water or respect the danger of wildfire. The governor will be encouraged to participate in future PSAs when warranted by conditions.

Television and Radio

DNRC will mail agendas to local television studios several days prior to DAC meetings. Interviews of the DAC chairperson or members will be encouraged before or following meetings. Press releases that summarize meetings will be sent to radio stations across the state since listening audiences are extensive, especially in agriculture.

V. DROUGHT ASSESSMENT

The term "assessment" is used in several different contexts in this plan. One deals with the assessments of water supply and moisture conditions. Another is drought impact assessment which summarizes the nature and extent of damage that drought has caused or is likely to cause to a natural resource or a sector of the state's economy. A third type of assessment evaluates the ability of local citizens and resources to mitigate drought impacts.

This section deals primarily with drought impact assessment which begins each spring, before impacts occur and continues as long as drought conditions persist. Timely and complete drought impact assessments are necessary to formulate effective responses. Effective assessment systems are developed over time and are based primarily on experience gained during drought.

ROLE OF ASSESSMENT

Assessing the potential for drought impacts provides a link between monitoring and response functions of drought management. In other words, the impact assessment will help decision-makers determine how and when to respond to an anticipated impact with an effective action. An effective impact assessment system informs state agencies, resource managers, the public, and the DAC of changes that can be made at the local and state levels to avoid economic loss and resource damage.

Ideally, relevant information should reach potentially-affected parties in time for them to take appropriate mitigative action. Through comprehensive impact assessment, the DAC can quantify losses incurred by those who mitigate impacts as opposed to those who take no mitigative actions. The difference between the two scenarios can be used to underscore the benefits of mitigation planning. Use of a risk assessment approach is helpful in expressing the probability and extent of impacts.

Each agency will assess drought impacts that are likely to occur based on drought information, and from actual observations gathered from personnel and residents in the field. This information will enable the DAC to:

1) be informed of current drought impacts;

2) forecast additional, imminent impacts;

3) evaluate actual damage;

4) consider mitigation alternatives; and

5) take action to mitigate further damage.

Drought impact assessment begins with state agencies and continues with individuals who are impacted by drought. Changing conditions cause both government and individuals to continuously reassess alternative ways to reduce impacts to resources and communities. Impact assessment should indicate what losses could occur if drought conditions continue and mitigation measures are not implemented. Future losses can then be projected for worsening drought scenarios. When probabilities are assigned to each scenario, the risk of economic or resource loss can be quantified and reported. Informed decisions can then be made since trade-offs are known.

In the early stages of a drought, most of the DAC agenda will be used to report and assess drought conditions by those agencies that monitor soil moisture, hydrological, and meteorological conditions. As drought conditions worsen and trouble spots are identified, more meeting time will be dedicated to reporting and assessing drought impacts and discussing mitigation strategies.

Each state agency will draw on a variety of sources of information to determine the type and extent of impacts currently being experienced or expected. These sources should include their district or regional offices, private organizations, and individuals. Projections of damage due to drought should be made using the best information available and past experience as a guide. Once a region of the state reaches the **Alert** status, as described in the following section, each agency will be required to provide a written impact assessment report with a response, and present the findings to the DAC. The state water plan section for drought management recommends that assessments be prepared on a regular basis for drought-related impacts to;

(1) specific crops and livestock,

(2) tourism,

(3) energy production,

(4) domestic water supplies,

(5) wildfire, and

(6) fish and wildlife.

The plan section recommends that the state: *"Coordinate the efficient and timely assessment of impacts related to various water uses. A list of the individuals with the expertise to assess impacts should be maintained."*

ASSESSMENT BY SUBJECT AREA

This section includes reviews, by subject area, of various methodologies used to assess the effects of drought on certain economic and resource sectors. It describes existing activities undertaken by agencies to assess how and to what extent drought has impacted, or will likely impact, the resources and economy of the state. The agencies responsible for these assessments and their requirements are outlined in section VIII; State, Federal and Local Response Actions, and in Appendix A, State Agency Annexes.

Dryland Farming

The Department of Agriculture (Agriculture) assesses impacts to dryland farming. The Montana Agricultural Statistics Service, in cooperation with Agriculture and the National Weather Service (NWS), produces The Crop-Weather Report on a weekly basis between April through October and monthly between November through March. The report provides a detailed summary of precipitation and temperature for stations in each of the seven major geographic regions of the state. Historical data are included for comparative purposes.

The Crop-Weather Report includes a list of the number of days suitable for field work; the progress of planting and harvesting as a percentage of average for the date; the percentage of topsoil and subsoil moisture supply expressed as short, adequate, or long; and the growth status and condition of major crops. The report also includes weather forecasts by the National Weather Service.

State extension offices provide detailed reports on dryland farming conditions upon request. State agricultural experiment stations throughout the state provide state extension service with crop and range information. Using these data and information from other sources, Agriculture will assess the economic impacts of drought to the various agricultural sectors.

Livestock Operations

The Department of Livestock (Livestock) is responsible for assessing the impacts of drought on the livestock industry. The representative from Livestock reports on range conditions, stock water availability, and other pertinent matters to the DAC beginning in April each year. Livestock uses its network of stock producers, 370 deputy state veterinarians, 20 brand inspectors, and 650 stock inspectors to gauge the needs and health of the industry at a particular time. The Montana Agricultural Statistics Service collects and reports data concerning range conditions and the birth and survival rates for cattle and sheep.

Through contact with state veterinarians and the Department of Livestock Diagnostic Laboratory Division, Livestock can determine the presence and incidence of disease and the health of livestock located in regions affected by drought. By monitoring brand inspections, certificates of veterinary inspection, and import permits, Livestock can track the movement of livestock across county and state lines. This information is useful in determining which regions are lacking adequate range forage.

Through communication with agencies such as NRCS, USFS, BLM, county extension agents, and conservation districts, Livestock can evaluate availability of stock water and range forage for a variety of lands and elevations. Stock water ponds and surface water supplies are often depleted before range feed. This situation necessitates importation of water or export of stock.

Assessment activities for the long term should include establishing a data base of information for future use. By reviewing records of past drought periods, projections can be made as to the probability of different outcomes given current conditions. The Livestock annex, like all state agency annexes to this plan, should be updated periodically to reflect knowledge gained during previous drought periods.

Irrigation Water Supplies

Several state and federal agencies report to the DAC on the adequacy of irrigation water for irrigated agriculture. The NRCS generates the Surface Water Supply Index (SWSI) which provides an assessment of future supplies of irrigation water for the growing season. It is used to determine the surface water supply in mountainous river basins dependent on runoff from snowpack for streamflow. The SWSI considers mountain snowpack, mountain precipitation, reservoir storage, and soil moisture in its computation of an index for each of 52 river basins in the state.

The Bureau of Reclamation manages several large storage projects in the state. Most of these projects supply water for irrigation. Operating plans are formulated with water user groups and projections for irrigation supplies are prepared each spring. Reclamation must consider other factors in reservoir management such as flood control and recreation.

The Army Corps of Engineers manages a portion of federal reservoirs for flood control. Storage for irrigation supplies can be limited by the volume of storage that must remain vacant to accommodate flood waters. As the season progresses, reservoir plans are adjusted to reflect changes in water supply. In addition to annual operating plans, state and federal agencies should develop and adopt reservoir operation plans that include drought contingencies.

Municipal and Domestic Water Systems

During drought conditions, the Department of Environmental Quality (DEQ) prepares assessments of municipal water supplies on a monthly basis for the DAC. DEQ is responsible for assisting communities in monitoring the adequacy of their municipal water supplies. Operators of municipal water delivery systems are licensed by DEQ and are required to attend workshops and training seminars to update and improve operational skills. Operators sample municipal water supplies on a regular basis for testing by DEQ for water purity and compliance with state and federal drinking water standards.

Drought conditions can concentrate impurities that exceed drinking water standards for communities that depend on surface water for municipal supplies. In communities that depend on groundwater for municipal water supplies, drought conditions can cause the rate of use to exceed the rate of recharge resulting in a net annual loss to an aquifer. This situation may cause the supply to change in quality, necessitating additional water treatment measures by users or operators to meet standards.

DEQ will closely monitor compliance with discharge permits and communities with a history of water supply and quality problems during drought and report its findings to the DAC. DEQ maintains a list of these communities for monitoring and assessment purposes. DEQ can assist these communities in applying for grants and loans for water system improvement.

Fish and Wildlife

The Department of Fish, Wildlife, and Parks (DFWP) is responsible for monitoring, assessing, and responding to the effects of drought on fish and wildlife. The DFWP annex to this plan describes the procedures and activities used to assess and mitigate impacts to fish (Appendix A).

DFWP focuses on streamflow levels that are obtained twice weekly from USGS stream gauge data to determine fishery impacts. DFWP maintains a list of chronically and periodically dewatered stream sections to target monitoring during periods of low flow. During drought, temporary gauges are installed in stream reaches that are susceptible to dewatering. The severity of conditions determines the appropriate response. Current data enables fishery managers to detect changes in flow early enough to take measures that will mitigate damage to fish populations (see Response section).

Personnel from regional offices investigate river reaches that have dewatering problems. Data collected from fish counts, spawning runs, and past droughts are assessed in the context of current conditions. Fishery biologists also monitor spawning activity, and unsuitable conditions are reported to Helena DFWP and the DAC. If conditions warrant, DFWP activates its instream water rights notification procedure as outlined in its plan annex. If DFWP does not have an instream right for a river reach threatened by dewatering, it may call a meeting of irrigators to explore options for leaving more water in the river to protect fish habitat. The governor may elect to send a representative to such meetings to facilitate a short-term solution. Another alternative is for DFWP to purchase and deliver water to livestock, allowing stockmen to stop diverting streamflow. DFWP may activate emergency fishing regulations including special catch limits or closure if conditions warrant.

DFWP prepares weekly reports during periods of low streamflow assessing and identifying actual and potential impacts to fisheries. Reported observations of fisherman and recreationists should be incorporated into assessments. DFWP will report on assessment and response activities monthly at DAC meetings. Written assessments and responses will be prepared for the DAC meetings.

Impacts to wildlife are monitored by regional offices and DFWP's Wildlife Division in Helena. If drought is affecting wildlife, DFWP will report its findings and mitigation plan to the DAC. During drought years, special regulations for fall hunting season may be modified with the goal of bringing big game populations into balance with available range forage.

Wildfire

DNRC is responsible for coordinating the state's response to wildfire with federal and local response units. In April of each year, DNRC's Missoula Fire Center assesses fire potential for the coming fire season. Equipment and funding for firefighting are allocated in accordance with this assessment.

Statistics are provided periodically during the season for the number of fires and acres burned. Maps and charts are used to illustrate the potential for fire for the regions of the state. DNRC reports directly to the public through the media and provides information as requested on land-use restrictions and closures.

Information concerning state and local conditions is also available from the U.S. Forest Service regional headquarters and from local ranger stations which are listed in local phone directories. DNRC issues news releases, as conditions warrant, to inform the public of current conditions. Public service announcements are aired statewide as fire conditions worsen.

The Fire Center depends on observations from recreationists and those who travel and work on public lands to report any indication of fire or imminent fire danger to local, state, or federal authorities. This support from the public often results in a quicker fire response, preventing extensive resource damage. DNRC fire officials will provide the DAC with assessments before and during fire season that describe wildfire potential on state and federal lands.

Public Lands

Public lands in Montana are administered by a variety of state and federal agencies including DNRC, DFWP, BLM, USFS, USFWS, NPS, Bureau of Reclamation, and Army Corps of Engineers. As drought conditions develop, these agencies collect information on conditions from various sources including field biologists, resource managers, reservoir operators, wildfire assessment teams, and the general public. Forecasts and assessment reports are reconciled with plans and actions taken when appropriate. Agencies will report changes in conditions or land use restrictions to the DAC in a timely manner.

Energy Production

Managers of hydroelectric facilities develop annual operating plans based on energy demand and projected surface water supplies. Arrangements to accommodate downstream fisheries, flatwater recreation, and navigation needs are considered in the annual operating plan. In the Columbia River drainage, reservoir operating agencies work closely with the Northwest Power Planning Council (NPPC) and agencies such as DFWP to balance instream flow and energy requirements.

Changes to reservoir plans may be made each year to reflect changes in the water supply outlook. Final operating plans are formulated after comprehensive assessments are made. Public comment on reservoir operations is documented at open meetings and taken under advisement by managing agencies. Reservoir plans for the season are announced by the Bureau of Reclamation and Montana Power Company through press releases as summer approaches.

Representatives of Montana Power Company, NPPC, Bureau of Reclamation, and the Army Corps are encouraged to report reservoir operating plans to the DAC each spring so that DAC agencies can identify potential problem areas and address concerns early before drought worsens. Toll-free phone numbers provide updated reservoir information to the general public.

Tourism

The tourism industry can suffer greatly from the effects of drought. Loss of non-resident and resident tourism business add to the economic impact suffered by the state's commerce during periods of drought. The Department of Commerce is responsible for monitoring and assessing the impacts of drought on tourism. Commerce will report monthly assessments to the DAC and formulate appropriate responses consistent with its annex to this plan.

The Institute for Tourism and Recreation Research at the University of Montana records and analyzes visitation figures to determine tourism's contribution to the state's economy. These figures can be used by Commerce to assess current and future impacts of drought on visitation and recreational use. Commerce has the ability to use its network of industry contacts to detect and monitor changes in levels of tourism in the state.

A toll-free phone number for long-distance inquiries is maintained by the tourism promotion division (See Apendix A, Commerce). Information is collected regarding current perceptions of residents and non-residents of conditions in the state. Data summarizing employment in the "services" sector (hotels and other lodging) is available on a monthly basis. These data can be reconciled with data from previous months or years to assess impacts.

Recreation

When the potential for wildfire on public lands increases, state and federal agencies charged with land management may be forced to implement restrictions on use. Public land closures are avoided, if possible, since recreational and occupational users have been helpful in reporting use violations and fires in the past. Closures should only be used to protect public resources and should not unfairly exclude recreationists while allowing activities such as logging to continue. Commerce can answer inquiries concerning fire conditions using the toll-free tourism phone line.

River recreation is impacted by low streamflows resulting from low mountain snowpack and precipitation. Fishing guiding, whitewater rafting, flatwater boating and fishing, and related service businesses all suffer during periods of drought. Commerce can assess the impacts of drought to these businesses by conducting surveys of licensed guides.

Secondary Commerce

The Department of Commerce monitors and assesses economic impacts to business and industry resulting from drought. Commerce collects data on income, wages, salaries, and employment at the state and county levels. Using these figures, Commerce can monitor the effects of drought on the state's economy. Responses to impacts can be evaluated later to gauge effectiveness and plan for future drought.

The industries most likely to be affected by drought are those which depend on the state's natural resources for their well-being. The two major industries affected by drought are agriculture and tourism. Timber harvesting can be directly affected by forest use restrictions or closures during periods of high wildfire potential.

Secondary businesses include those with customers that have been directly affected by drought and whose ability to spend has been reduced. The Department of Commerce assesses the impact of drought on secondary businesses by reviewing income and employment data available from the state's Department of Labor and Industry and the U.S. Bureau of the Census (See Appendix A for Commerce Annex).

VII. DROUGHT RESPONSE

In the following section the term "response" refers to an action that is taken to preempt or mitigate an impact caused by drought. The type and timing of responses depend on factors such as characteristics of the affected region, rate of onset of impacts, legal implications, and availability of mitigative responses.

TRIGGERING MECHANISMS

In keeping with the guiding philosophy outlined earlier in this plan, the timing of responses to drought must be preemptive in nature. To make this plan operational, drought must be defined in terms of a comprehensive, quantitative measure that is used as an objective triggering mechanism for specific state action.

At the same time, the state must retain flexibility to address situations where strict adherence to or reliance on a specific threshold would be inappropriate. The state must also ensure that this discretionary latitude does not weaken the proactive approach by forestalling timely responses.

Drought Indices

The Palmer Drought Severity Index (PDSI) and the Surface Water Supply Index (SWSI) are the primary indices used by the DAC as indicators of drought. The PDSI is a soil moisture index based on measured precipitation, estimated evaporation and evapotranspiration, and climatic characteristics. PDSI figures are available for over 140 stations statewide.

The SWSI projects streamflow for runoff and snowmelt-driven hydrologic regimes. The SWSI is based on snowpack, mountain precipitation, soil moisture, and reservoir storage. The NRCS calculates SWSIs for over 50 individual Montana river basins.

As noted earlier, SWSI and PDSI values are generally 2 to 3 weeks old when reported at DAC meetings. Consequently, they do not reflect the effect of precipitation occurring during the period of time between the calculation and presentation of data. Often, current moisture and water supply conditions have changed significantly since SWSI figures were last released.

Since the SWSI provides a projection of future surface water supplies, it is better suited for forecasting conditions than the PDSI, which summarizes soil moisture data for a geographic location factored with long-term climatic data for that location. As a long-term indicator of drought, PDSI values are influenced by the conditions of previous months. Therefore, PDSI values may be slow to indicate a recovery from drought following a period of normal precipitation or the return of drought following recent dry conditions.

Decision-makers may interpret soil moisture and the recovery from drought as satisfactory, when in fact, precipitation has been well below average for weeks. A close examination of additional, current data by the DAC is therefore warranted. Data for this period is addressed by consideration of " other drought indicators " in the response strategy.

Other Drought Indicators

A thorough examination of additional current moisture and water supply data enables decision-makers to confirm the conditions as represented by the PDSI and SWSI. By considering a variety of drought indicators, the DAC can be assured its actions are timely and appropriate.

These "other" indicators include, but are not limited to:

1) Precipitation since prior month's end;

2) Snow water equivalent of remaining snowpacks;

3) Current and projected reservoir storage levels;

4) Current streamflows;

5) Current soil moisture levels;

6) Short-range weather forecasts;

7) Rate and nature of change in any of these factors;

8) Agency personnel field observations;

9) Reports from the public.

Although some of the indicators listed above are factored into the PDSI and SWSI, the DAC must decide whether a closer examination of the additional data supports or conflicts with SWSI and PDSI values for a particular region or county. If the other indicators conflict with the SWSI or PDSI, the DAC can defer to the judgement of the DAC scientists.

Emergency meetings

DNRC will continue to monitor drought conditions and report to the chairperson if conditions worsen. If conditions warrant, the chairperson can call an emergency meeting of the DAC to confer with the committee regarding a state disaster declaration or a drought status change.

In lieu of an emergency meeting, the DAC chairperson can instruct DAC agencies to implement actions when a set of predetermined conditions occurs. This stipulation is included because drought conditions can worsen quickly. It provides a measure of safety since delaying a response until the next monthly meeting could preclude a timely and effective response.

DROUGHT "ALERT"

Execution of the response function of this plan corresponds with two levels of below average moisture conditions. State and local response is triggered by quantitative levels of the PDSI and the SWSI. As mentioned in the preceding section, PDSI and SWSI values must be confirmed by an examination of additional current data. Notwithstanding a discrepancy between the two indices and current data, a drought **Alert** will be in effect when, by April 15, monitoring indicates that a county is entering initial levels of drought.

An Alert status will be assigned by the DAC, if by April 15, a river basin registers a SWSI index of -2.5 or less, or the same area has PDSI values of -3.0 or less, and additional current data, such National Weather Service (precipitation, forecasts, soil moisture) and U.S. Geological Survey (streamflow) confirm the PDSI and SWSI values for the preceding month. Counties that had drought conditions entering the preceding winter will be closely monitored for change early in the season.

When a county is assigned an Alert status by the DAC, a series of actions at the state and local levels is triggered. The appropriate actions will depend on the time of year, the area's economy, and location of the county. (Specific agency responses can be found in the "Drought Responses" sections of Part VIII: Federal, State, and Local Response Actions and Appendix A: Agency Annexes.)

State Response

State actions taken during the Alert period are important for mitigating drought impacts. During this period, the state advises counties to consider appropriate preemptive measures at the local level would be appropriate. State agencies anticipate possible impacts to people and resources and plan accordingly. The required state actions are listed below:

1) The DAC will request that the governor advise counties with an Alert status to convene local drought advisory committees (LDACs) and communicate with the DAC regarding local conditions. This request is made by letter to county commissions and by press release.

2) The DAC will request state agencies to activate their plan annexes and prepare impact assessments. State agencies will present response strategies to the DAC in written form for the worst case scenario of worsening conditions.

3) DNRC prepares news releases, to be issued by the governor's office, summarizing conditions and explaining reasons for activation of LDACs.

4) The state library will issue water supply and/or moisture condition maps to the media for publication and broadcast.

5) The DAC staff will distribute information to LDACs, and county commissioners including materials to guide local drought management operations, and inform localities of available state and federal assistance.

6) The DAC considers increasing the frequency of meetings in response to the nature and rate of changes in drought conditions.

7) DNRC coordinates the preparation of additional updated SWSI and PDSI maps and assessment reports.

8) The DAC advises state and federal agencies to review reservoir operation plans and implement appropriate drought contingency plans.

County Response

LDACs review water supply and moisture data gathered by state and federal agencies and, if warranted, prepare to mitigate imminent impacts.

1) County Commissions will activate LDAC and review and update membership to determine whether all local, water-related interests are represented. LDAC meetings must be advertised using local media. LDAC should start meeting on a regular basis.

2) LDAC will appoint a chairperson to coordinate local efforts and provide DAC staff with status report on local conditions and anticipated needs. LDAC chairperson will refer to local drought management operations manual for checklist of potential problem areas.

3) A county with an Alert status must closely monitor its municipal water supply to determine adequacy for its foreseeable future demands. If applicable, discharge permits must be monitored for compliance. Concerns should be reported immediately to DEQ and DAC.

4) Enacting a municipal water rationing ordinance should be considered if conditions have not improved by June 1. At a minimum, voluntary water conservation measures should be implemented.

5) LDACs initiate dialogue with county USDA Food and Agriculture Committee (FAC) to ensure coordination of local crop damage assessment reports (DARs) used to establish county eligibility for Secretarial Natural Disaster Determination (USDA) assistance programs (see appendix for chronology of actions for USDA natural disaster determination process).

6) If applicable, the LDAC should initiate dialog with a standing river basin planning committee concerning water supply shortages and potential impacts to water uses and businesses.

"SEVERE" DROUGHT

A county or region will be assigned an **Severe Drought** status when drought indices indicate steadily worsening conditions and precipitation forecasts indicate no improvement in the near future. A review of **current** water supply and moisture data gathered from additional sources, such as NWS (precipitation, forecasts, soil moisture) and USGS (streamflow) is used to confirm the most current PDSI and SWSI values.

For purposes of this plan, a county(s) will be assigned the Severe drought status, if by May 15, a river basin(s) of that county(s) reaches a SWSI index of -3.5 (extremely dry) or less, **or** has PDSIs of -4.0 or less (extreme drought), **and** the projected precipitation or water shortage is likely to create undue hardships for water uses and users.

NOTE: This status is **not** related to the federal Secretary of Agriculture (USDA) Natural Disaster Determination process. It can provide support for the **state's** drought disaster declaration process. (Specific agency responses are found in the "Drought Responses" sections of Part VIII: Federal, State, and Local Response Actions and at Appendix A; Agency Annexes.)

State Response

1) The DAC requests that the governor officially declare counties with DAC Severe Drought status a drought disaster.

2) The DAC will request that state agencies implement appropriate mitigation responses, based on current impact assessments in accordance with agency annexes to this plan.

3) DNRC will issue news releases through the governor's office explaining current drought conditions and recommended actions.

4) DES will contact local disaster services in counties with a Severe Drought status regarding federal disaster designation process.

5) DAC will increase the frequency of meetings with emphasis on assessment and response activities. The DAC will continue to monitor conditions, especially for significant changes.

6) On behalf of the governor, DES will facilitate the federal natural disaster determination process with state USDA officials and report progress to governor and DAC.

7) DEQ Water Quality Division will contact communities with a history of municipal water supply problems or discharge permit noncompliance to determine the extent of water quantity and quality and report these findings to DAC.

County Response

1) LDACs and counties will continue to monitor municipal water supplies and MPDES compliance for adequacy and quality and report assessments to DEQ.

2) If a county has a Severe drought status and an active river basin planning committee, the committee should coordinate responses with the county LDAC.

3) LDAC's will recommend to county commission to request governor through DES, to initiate Natural Disaster Determination process with Secretary of Agriculture.

4) LDAC should refer to LDAC operations manual for specific action recommendations in counties under drought emergency in local areas of concern.

5) LDACs will send impact assessment reports to DAC to inform state agencies of local conditions and needs. Representatives of LDACs are encouraged to attend DAC meetings to report local conditions and needs.

6) LDACs will use local press and radio for public service announcements regarding water conservation, status of local conditions, LADC meeting times, and restrictions or prohibitions.

7) LDAC's will maintain dialogue with USDA county FAC to ensure damage assessment of crops is underway.

8) Local government will implement municipal water supply rationing ordinances and enforcement provisions.

VIII. STATE, FEDERAL, AND LOCAL RESPONSE ACTIONS

The following section identifies most responsibilities of DAC member agencies and supporting agencies in monitoring and assessing drought and responding to its impacts. Listed are state, federal, and local government response actions for the mitigation of drought-related impacts. This section is intended to supplement, not replace, the state agency annexes to this plan included in Appendix A.

For each governmental entity listed and where applicable, activities are divided into "ongoing activities" and "drought response" activities. Ongoing activities represent long-term efforts that reduce the vulnerability of people and resources to future drought. "Drought responses" are short-term, mitigative measures taken during a drought, or if drought is imminent.

Where applicable, "Drought responses" is divided into "Alert" responses and "Severe Drought" responses corresponding to the two-tiered drought status triggered by worsening conditions. The timing and order of responses will vary, depending on conditions. Each agency must determine the appropriate type, amount, and timing of a specific response.

STATE AGENCIES

State agencies that are members of the DAC are committed to certain responsibilities in the areas of monitoring, reporting, assessment, and response that are described in more detail in the agency annexes detailed in Appendix A.

GOVERNOR'S OFFICE

As the most visible figure of state government, the governor is in the best position to draw attention to the effects drought can have, or is having on the state and unite the government and people in a coordinated response. This is accomplished by official actions, such as a disaster proclamation, public service announcements and by direct appeals to the citizens through the media. The governor's DAC representative must be appointed by the governor. Traditionally, the lieutenant governor has served as the DAC chairperson.

Ongoing Activities

1) Appoints a representative to act as chairperson of the DAC.

2) Appoints additional, non-voting members to the DAC to represent public and private water-related interests. DAC membership should be reviewed each year by the chairperson to determine if membership is comprehensive with respect to interests affected by drought.

3) Through the chairperson, convenes the DAC on or around the 15th day of February and October to assess moisture and water supply conditions.

Drought Responses
Alert

1) Responds, as conditions warrant, to the information provided by the DAC in the annual "Governor's Report Describing the Potential for Drought", by directing chairperson to convene the DAC meetings and activate the Montana Drought Response Plan.

2) Supports and coordinates the monitoring, assessment, and response functions with the Northwest Power Planning Council for the Columbia River Basin and other basin states.

3) At the recommendation of the DAC, urges county commissions in regions with a high probability of drought, to form local drought advisory committees to mitigate drought impacts and serve as a local contact for the DAC.

4) Makes appeals, as conditions warrant, to agriculture, industry, and domestic water users to conserve limited water supplies. This is accomplished through public service announcements for radio and television, press releases, announcements at DAC meetings, and attendance at regional or local drought meetings.

5) Promotes awareness of the dispute resolution services offered by the governor's office. The services of the Montana Consensus Council can be used to resolve conflict between water user groups.

6) Issue news releases to the press following official state actions and DAC meetings advising citizens of conditions and actions to take on a local basis.

Severe Drought

1) Reviews water supply information and, if conditions warrant, issues executive order imposing a state of emergency not to exceed 20 days in duration. This allows the suspension of processing of applications for water quantity permits by DNRC for 20 days as well as other emergency measures deemed appropriate and within the law.These may include restrictions on water use or use and/or travel on public lands.

2) If, at the conclusion of 20 days, conditions prompting the executive order are the same or worse, issue an executive order declaring a drought disaster not to exceed 30 days. This action suspends, until declared otherwise, the authority of DNRC to process applications for new water uses. It also clears the way for restrictions on controlled burning, travel and types of activities allowed on public lands, and restrictions on water use. The proclamation adds an element of urgency to the situation and supports the request for a federal disaster designation.

3) At the request of county commissions, initiates the Secretarial Natural Disaster Determination process by asking state USDA officials to request damage assessment reports (DARs) from county USDA emergency boards. After DARs are completed, request a natural disaster determination from the Secretary of Agriculture.

4) Authorizes access to the Environmental Emergency Contingency Program. This fund can be used for emergency situations, such as purchasing or leasing water to augment low streamflow.

5) Holds regional drought meetings to hear the concerns of local economic sectors and interest groups concerning local conditions, the state's drought response, and assistance.

DEPARTMENT OF NATURAL RESOURCES AND CONSERVATION

DNRC is the primary state agency with regulatory authority governing the use of water. As surface water supplies diminish, the tendency for conflict between interests competing for quantities of water increases. Initially, such conflicts are addressed by agency policy and ultimately with administration of the state's water rights laws. DNRC also has regulatory authority to manage the state's water storage projects, water quantity measurement, and groundwater appropriations. DNRC supports the "Montana Watercourse" adult water education program and the "Project WET" program for teachers and students located at Montana State University.

Ongoing Activities

1) Pursuant to **2-15-3308, MCA 1991 Drought Advisory Committee**, administer and staff the DAC, and participate as a voting member on the DAC.

2) Administers the Renewable Resource Grant and Loan Program to promote and advance the beneficial use of water by providing grant and loan financing for projects that promote the development and efficient use of water resources.

3) Administers the Montana Floodplain and Floodway Management Act, which applies to any construction within the designated 100-year floodplain for a stream.

4) Conducts water resources planning activities including basin planning, policy formulation, and other activities pursuant to **85-1-203 MCA**, state water plan, that promote conservation, development, and utilization of the state's water resources.

5) Promotes and facilitates awareness of Montana's water resources and related issues through educational programs offered by The Montana Watercourse and Project Wet at Montana State University in Bozeman.

6) Continues to participate as a cooperator in the streamflow monitoring network with USGS and DFWP.

7) Through the Conservation District Bureau, conducts workshops for conservation district supervisors and irrigators on administration of the Montana Natural Streambed and Land Preservation Act (310 Permit program) and train irrigators onsoil moisture monitoring and irrigation practice. Grazing and riparian land management education is also available.

8) Encourages and assists irrigation districts and water user associations in developingand implementing drought contingency plans. Such plans may include, but arenot limited to, recommendations for irrigation scheduling, voluntary conservation,and structural improvements to irrigation delivery systems.

9) Coordinates the development and implementation of drought contingency plans forstate-owned reservoirs with water users and DFWP. Such plans must clearly identify minimum pool levels, and minimum instreamflow requirements downstream of the reservoir. This measure is required to prevent sedimentation from entering stream courses below the reservoir and to protect aquatic and fish habitat.

10) Pursues the implementation of **85-2-150 MCA Chronically dewatered watercourse-identification** which identifies such waters, the extent and effects of the impacts, and possible solutions to conflict among users including installation of measuring devices.

11) Provide timely information, as requested, for inquiries concerning water rights. Inquiries increase significantly during drought.

12) Process and expedite temporary water right transfers in compliance with **85-2-407 MCA Temporary changes in appropriation right**. Transfers can mitigate drought impacts by redistribution of water from lower to higher value uses.

13) Emphasize that state law allows the lease **(85-2-435 MCA)** or sale of surplus **(85-2-415 MCA)** or salvaged **(85-2-419 MCA)** water. These laws can serve to mitigate drought impacts by redistributing water from areas of surplus to areas of deficit water supply.

14) Pursuant to **Section 85-5-111. Water commissioner and mediator education**, provide an educational program for water commissioners and mediators that includes training seminars on duties of commissioners, mediation techniques, and water measuring techniques, and prepare a mediation manual. Develop an outreach program that identifies persons who might serve as water commissioners or mediators.

15) Facilitate the implementation of new and existing statutes that allow the leasing of consumptive water rights for the enhancement of instream flows.

16) Assist watershed planning groups to develop and implement drought mitigation plans.

Drought Responses
Alert

1) As needed, prepare and distribute the DNRC Water Supply and Moisture Condition Report which summarizes data received by state and federal agencies and is the primary source of data used by the DAC for drought monitoring and decision-making.

2) Provide assessments, as conditions warrant, of water supply conditions and report findings to the DAC.

3) Assist LDACs in managing drought at the local level by providing water supply and moisture condition data, strategies for mitigating drought impacts, and information on sources of technical and financial assistance.

4) In river basins with ongoing basin planning initiatives, encourage long-term drought management planning and coordination with LDAC's.

Severe Drought

1) Administer the Renewable Resource Grant and Loan Program Emergency Fund, a limited source of funding for emergency situations such as municipal water supply development and supplementing critical streamflows to avert collapse of fisheries.

2) Implement DNRC's "Water Use Conflict Resolution Policy" which outlines the procedure for grievances and enforcement of water rights (see Appendix A DNRC Annex).

3) Advise governor on imposition of executive order imposing temporary moratorium on processing of new water use permit applications by DNRC and other drought disaster determinations.

4) Expedite the processing of "change of use" applications from water users attempting to mitigate drought impacts to irrigated agriculture by transferring water from one area to another. Drought conditions change the accessibility of normal points of diversion of water. A "change of use" must be approved before an irrigator can change the point of diversion.

5) Expedite the process for issuance of new water use permits, especially for groundwater permits to deepen or drill wells which serve as a short-term alternative to surface swater during drought provided there are no legitimate objections.

6) Closely monitor state-owned reservoirs for compliance with drought contingency plans.

7) Enforce water right provisions of Montana Water Use Act.

State Lands

DNRC is responsible for the administration and management of approximately 5 million acres of state-owned land. DNRC's primary land management responsibilities relative to drought are in the areas of fire prevention and suppression, and protecting the productivity of leased state lands. Most of this land is leased for agricultural purposes, such as grazing to generate revenue for the state school trust fund.

Ongoing Activities

1) Participates, as a voting member, on the DAC.

2) Implements programs to conserve water on state lands.

3) Promotes safe use of public lands through fire safety programs.

4) Updates, on a daily basis, the fire danger rating system by evaluating current weather and fuel moisture conditions gathered at over 90 reporting stations in Montana.

5) State Lands field offices provide specific fire information on a regional basis.

6) Pursuant to state law,protects and ensures the wise management of school trust lands by taking measures to reduce the vulnerability of the land to impacts caused by drought conditions.

7) Performs field evaluations of the condition of state lands leased for grazing and agriculture to determine an appropriate plan to prevent the long-term decline in productivity of the lands from over-use exacerbated by drought conditions.

Drought Responses
Alert

1) Prepares regional contingency plans to DAC for grazing and agriculture to prevent long-term decline in productivity of the lands from over-use exacerbated by drought conditions.

2) Minimize areas of wildfire impact through wildfire prevention, pre-suppression,and suppression activities and programs.

3) Identifies areas of extreme fire danger due to drought conditions and provide continual assessments to DAC of the capabilities, resources, and sources of assistance available both within and outside the agency.

Severe Drought

1) Issues press releases to the public on fire conditions and fire prevention practices.

2) Restricts fires permitted on state lands, when conditions warrant, by canceling open burning permits and requesting the public to voluntarily cease use of open fires.

3) Imposes, as fire conditions warrant, restrictions on the types and hours of activities engaged in by persons, firms, or corporations on state lands.

4) Implements closure of state lands, when fire conditions warrant

5) During periods of fire danger, prepare a daily situation report on the usage of all firefighting equipment and activities of personnel.

6) Continue to provide DAC with assessments of fire situation on a regional basis, and report on response and suppression efforts.

DEPARTMENT OF FISH, WILDLIFE, AND PARKS

Reduced streamflow is one of the most visible and most publicized impacts of drought in Montana. Low streamflow is detrimental to the state's stream fisheries, especially for wild trout. DFWP holds water rights on a number of streams for maintenance of instream flows during periods of low flow. Streamflows are monitored statewide on a regular basis to determine where fishery damage is likely to occur.

During drought, DFWP is challenged with managing declining populations of "species of special concern" such as arctic grayling, westslope cutthroat trout, and bull trout. Reproduction and living space are threatened by natural and man-caused low streamflow. Recent successes between DFWP and water users in streamflow management during drought illustrate the potential for enhancing fisheries through collaborative efforts. Wild game populations compete with domestic livestock for limited forage during drought, requiring special game management.

Ongoing Activities

1) Protects DFWP's instream flow rights, also known as "Murphy Rights," and water reservations through expansion of stream-gauge monitoring network and instream flow protection program.

2) Participates with USGS as a cooperator in expanding and maintaining baseline streamflow monitoring network.

3) Maintains and updates DFWP list of chronically-dewatered streams to provide information on extent of stream dewatering from the fisheries and aquatic habitat standpoint.

4) Participates in development of state, federal, and private reservoir annual operating plans to minimize impacts to fish, wildlife, and recreation.

5) Reviews water supply forecasts in early spring to monitor and identify potential effects of streamflows on fish and aquatic habitat. Monitor fish populations, fishing use, and harvest statewide to ensure carryover of wild stream fisheries while maintaining reasonable opportunity for harvest in all streams and lakes.

6) Administers the Montana Stream Protection Act (124 Permit) which regulates any federal, state, county, or city government project that may affect the bed or banks of any stream.

7) Participates as a team member in the 310 permit review process of the Montana Natural Streambed and Land Preservation Act with conservation district supervisors and landowners. Help conduct site inspections to ensure considerations for fisheries in design and construction of proposed projects.

8) Participates in the development and implementation of drought contingency plans for state-owned reservoirs with DNRC.

9) Identifies high priority streams for instream flow water leasing program and obtain leases to enhance flows for sport fisheries and species of special concern.

10) Prepare public service announcements, press releases, and magazine articles to inform the public about drought effects on fisheries and how to minimize these stresses through voluntary practices.

Drought Responses
Alert

1) If NRCS spring water supply outlook reports project low streamflows for coming months, initiates monitoring of flows on streams with "Murphy Rights" and water reservations, and develops protection strategies in anticipation of drought conditions.

2) During periods of drought, prepares weekly regional drought updates or assessments for the DAC describing the status of the state's fisheries and wildlife with respect to drought-related impacts and measures taken to mitigate them.

3) Facilitates augmentation of streamflows through purchase of stored water, leasing of consumptive rights, and other innovative methods including partnerships with water users to solve dewatering problems on critical streams.

4) Convenes meetings of Upper Missouri River Advisory Committee to discuss reservoir operations, minimum flows and pool levels with Bureau of Reclamation, Montana Power Company, and recreationists.

5) With assistance from agricultural representatives, distributes educational material to water user associations describing methods to reduce trout losses in irrigation diversions.

6) When possible, installs temporary stream gauges to monitor flows for fishery evaluation studies and recreational use on river reaches that have an imminent threat of dewatering.

7) Encourages irrigators to switch from using gravel dikes to divert water to permanent design-engineered diversion structures or use of portable metal diversion devices which are less destructive to streambeds.

Severe Drought

1) If forecasts and conditions warrant, protect existing instream flow rights by notifying junior water rights holders that they may have to cease diversions and honor DFWP's senior instream flow rights (see Appendix A, DFWP's Annex).

2) Implements emergency fishing regulations on streams and lakes as conditions warrant (usually means decreasing harvest on streams and increasing harvest on lakes and reservoirs with low pool levels).

3) When warranted, make request through DAC chairperson for local meetings with irrigators, and DFWP area biologists to explore opportunities for increasing streamflows that are reaching critical levels.

4) Investigates reports of depredation of livestock forage by wildlife and implement appropriate game management actions to reduce those impacts.

DEPARTMENT OF ENVIRONMENTAL QUALITY

Of all the impacts presented by drought, those that affect human health merit the highest priority. Drought has the potential to affect both water quantity and quality. The Department of Environmental Quality (DEQ) is charged with protecting Montana's environment. During drought, DEQ will take measures to protect ecosystems from the effects of polluted water. To accomplish these objectives, DEQ will pursue a comprehensive strategy of ongoing water quality monitoring, assessment, and mitigation.

Ongoing Activities

1) Participates at all DAC meetings as a voting member and on subcommittees as directed by chairperson of DAC.

2) Maintains and updates list of communities with history of municipal water supply problems and concentrate monitoring and drought response planning efforts. Assist communities with inadequate water supply systems or wastewater treatment facilities in procuring alternative sources of funding to make appropriate changes or necessary upgrades.

3) Provides technical assistance to utilities and local health departments on water shortage response planning and implementation. Conduct training seminars for municipal water systems operators to manage systems during drought.

4) Encourages communities to educate citizens to conserve water during drought, provide list of educational materials available from county extension offices, encourage systems operators to participate in local drought planning efforts, and encourage adoption of water use restriction ordinances.

5) DEQ mails a memo to counties announcing training opportunities in xeriscaping (landscaping with drought-tolerant plants), leak detection, water rate structuring, irrigation with sewage effluent, conservation. Target audiences include water/wastewater operators.

6) Administers the Montana Pollution Discharge Elimination System (MPDES) permit system. Monitor surface water quality where point sources such as industry and municipal wastewater treatment plants discharge effluent to determine point at which receiving waters become contaminated (Decreased streamflows in receiving waters mean that a given level of discharge will comprise a greater percentage of total flow).

7) Assists municipalities in the protection of public water supply systems throughout the state.

8) Administer program to maintain surface water quality standards; Short-Term Exemption From Montana's Surface Water Quality Standards (3-A - Authorization). Low flows during drought make receiving waters more vulnerable to violations of water quality standards.

9) Improve monitoring and enforcement in administration of 3-A law. Educate conservation districts, irrigators, construction contractors, and others who have occasion to cause disturbances to streams of need to acquire 3-A permit.

10) Sponsor and encourage legislation that provides incentives for water conservation, i.e.municipal water rates should not provide a "quantity discount" that encourages higher use. Flat rates or rates that increase with volume of use control waste. Low flush toilets should be required by state building codes. These measures reduce the amount of wastewater treated and the contamination of surface water in periods of low flow.

11) Maintains and update list of educational materials that promote water conservation measures such as xeriscaping and installation of water-saving devices by homeowners. Xeriscaping means landscaping with less water-dependent plant species.

12) Continues to educate the general public on issues that affect water quality, such as non-point source pollution since low flows exacerbate impacts of drought on water quality.

Drought Responses
Alert

1) Monitors waters where discharges may cause impacts to aquatic life and take measures to mitigate damage. Report assessment and response action to DAC at meetings.

2) Monitors waters where discharges may cause impacts to beneficial uses of water and take action to prevent damage. Report assessment and response action to DAC at meetings.

3) Maintains updated drought information newsletter during periods of drought that describes status of conditions and identifies sources of state assistance to water suppliers, encourages local planning including watering restrictions and other conservation measures.

4) Promotes public awareness of water conservation methods during drought using PSAs and videos produced for television.

Severe Drought

1) If an MPDES permit falls into noncompliance, and as a result, public drinking water supply is at risk, issue boil orders and health advisories to the public. Report assessment and response immediately to DAC through chairperson and at meetings.

DEPARTMENT OF AGRICULTURE

Montana's agricultural sector suffers the greatest economic impact during drought. The Montana Department of Agriculture provides support to producers with direct access to sources of assistance during periods of drought, such as the "Hay Bank." Agriculture coordinates assistance programs with the federal government through the Department of Agriculture (USDA).

USDA is the primary source of financial assistance for producers suffering economic loss from the direct impacts of drought. **The Montana Drought Relief Assistance Reference Guide**, available upon request, summarizes the financial and technical assistance programs offered by state and federal government agencies for losses resulting from drought.

Ongoing Activities

1) Participates as a voting member of the DAC and on subcommittees thereof, as requested.

2) Generates the Crop-Weather Report, as a cooperator with the USDA, NWS, and Extension Service, which provides the state with weekly data on crop conditions, soil moisture, temperatures, and precipitation.

3) Maintains and improves the services offered by the Agriculture Electronic Bulletin Board to provide producers with regular and special informational needs.

4) Coordinates assessment and response activities with Department of Livestock and report findings and recommendations to DAC. Prepare regular assessments of impacts to agriculture from drought for the DAC and recommend mitigative responses.

5) Continues research and education in cooperation with state Extension Service regarding agricultural water conservation practices, and development of drought-resistant varieties of grain and feed.

6) Encourages irrigators to use available technology in their operations including "Agri-Met",the Northwest Cooperative Agricultural Weather Network system developed by U.S. Bureau of Reclamation and the Bonneville Power Administration, to conserve water and energy.

7) Works with USDA to develop a fire and insect program which includes Conservation Reserve Program (CRP) lands.

8) Coordinates fire management planning with DNRC for CRP lands.

9) Represents state agriculture and participate on subcommittees as assigned by the DAC Chairperson.

Drought Responses
Alert

1) Report to DAC assessment of potential for economic damage to major agricultural sectors given continuation of present conditions and outline mitigation strategy.

2) During drought, the electronic bulletin board (EBB) maintains a "Hay Bank" that compiles an updated list of potential buyers and sellers of feed. Load "Ag" file on EBB with mitigation strategies and sources of technical assistance.

3) In conjunction with state extension service, offers educational drought workshop for producers of crops impacted by drought.

Severe Drought

1) Continues to report assessment of impacts and status of mitigation response to DAC and load EBB with information on status of USDA Secretarial Natural Disaster Determination process and sources of financial assistance.

2) Facilitates the state's role in the USDA Secretarial Natural Disaster Determination process with DAC staff and DES by meeting with USDA officials as needed and responding to inquiries from citizens.

DEPARTMENT OF LIVESTOCK

The Department of Livestock works closely with the state Department of Agriculture to provide livestock producers with support during drought. The department's network of deputy state veterinarians, district brand inspectors, and deputy state stock inspectors provide a valuable source of information for assessment of drought impacts through their daily work and observations. Livestock's annex to this plan provides a comprehensive list of available services with phone numbers for assistance to producers during periods of drought.

Ongoing Activities

1) Participates as a voting member on the Drought Advisory Committee.

2) Encourages livestock producers to develop alternative water supplies. Work with local county soil conservation districts to enhance existing water supplies and find alternative sources.

3) Uses the Department of Livestock laboratory for analysis of water quality for livestock use and animal health.

4) Works with the Soil Conservation Districts to educate livestock producers on stream bank riparian protection to maintain water supplies.

Drought Responses
Alert

1) Works with Department of Agriculture concerning animal health concerns in moving livestock as outlined in the annex.

2) Increases predator control, especially where livestock has not been grazing and a high population of predators have been preying on wildlife, or where the normal prey of the predator has been reduced due to the drought.

3) Develops range information to accompany the "Hay Bank" hotline available through the state electronic bulletin board.

4) Through network of state veterinarians and brand inspectors, increases level of monitoring and feedback concerning conditions as drought worsens. Use video cameras to record range conditions for assessment and presentation to DAC.

5) Summarizes assessment of conditions and report mitigation strategy to DAC.

Emergency

1) Continue to report damage assessments to DAC and status of mitigation response efforts.

DEPARTMENT OF COMMERCE

As a voting member of the DAC, the Department of Commerce is informed of drought conditions on an ongoing basis. Commerce assesses the likelihood of impacts to tourism for regions of the state as conditions worsen. It can advise visitors and potential visitors of forest closures due to fire or fire danger and of limitations on river recreation due to low flows. In addition to providing drought impact information, Commerce provides information on alternative travel planning for visitors. Commerce also maintains economic statistics used to assess the impacts of drought.

Ongoing Activities

1) Participates as a voting member on the DAC and on subcommittees thereof, as requested.

2) Maintains current and historical data on the state's economy from the U.S. Department of Commerce to assess the impact of drought on the state.

3) Maintains the toll-free phone number at the Montana Tourism Promotion Division that provides information for out-of-state callers (800) - VISIT MT. Accurate information concerningthe extent of drought impacts, including forest closures due to fires, and streamflows, can address concerns of tourists and encourage visitation.

Drought Response
Alert and Severe Drought

1) Generates assessments on an ongoing basis of the impacts of drought on tourism, industry, and other monitored economic sectors and report findings with response strategy to DAC and tourism industry.

2) Apprises outfitters and guides of streamflow forecasts and back country fire conditions and restrictions through Board of Outfitters and Guides.

DEPARTMENT OF MILITARY AFFAIRS
DISASTER AND EMERGENCY SERVICES DIVISION

Disaster and Emergency Services (DES) is a voting member of the DAC. It is the state agency that specializes in disaster response and management. Although its expertise primarily addresses sudden catastrophic occurrences, DES assumes a lead role in DAC matters of official natural disaster determinations on the state and federal levels and in the coordination of federal assistance.

Ongoing Activity

1) Participates as a voting member on the DAC and serves on subcommittees, as designated by the chairperson of the DAC.

Drought Responses
Alert

1) Acts as liaison with local DES coordinators, before and after the formation of local drought advisory committees, to assess needs and provide support and information regarding federal programs.

2) Monitors progress of drought and identifies counties where impacts are most likely to occur. Directs information concerning sources of assistance to those counties.

Severe Drought

1) Assists the DAC in directing emergency or disaster program functions as authorized by the governor.

2) Assists the DNRC with providing information concerning the drought designation process to any agency or individual requesting assistance.

3) Drafts correspondence on the USDA Secretarial Natural Disaster Determination process for the governor and county commissioners.

4) Assists and coordinates damage assessment activities, as needed. This task generally involves compiling agricultural damage information which is part of the packet forwarded to the governor.

5) Coordinates the application process and implements procedures for drought declarations, assists in formulating any executive orders or proclamations, and acts as the liaison withother agencies and organizations in developing the drought declaration process.

MONTANA STATE LIBRARY
NATURAL RESOURCE INFORMATION SYSTEM (NRIS)

1) Produces map of state for Surface Water Supply Index (SWSI) using data generated by the NRCS. The SWSI map projects surface water supplies for more than 50 river basins statewide. It is used primarily to determine the availability of water for irrigated agriculture and instream flow. The DAC uses the SWSI in conjunction with the PDSI as a triggering mechanism for the activation of prescribed responses to drought conditions as they develop.

2) Produces map of state for the PDSI from data generated for over 130 geographic points statewide. The PDSI is used as an indicator of current soil moisture conditions for prairie or dryland farming. The PDSI is used in conjunction with the SWSI as a triggering mechanism for the activation of prescribed responses to drought conditions as they develop.

3) Loads state electronic bulletin board (EBB) NRIS section labeled "Drought" with PDSI and SWSI maps and other data provided by federal agencies that monitor conditions for the DAC. Loads and updates electronic bulletin board with state agency assessments of conditionsand projections of impacts in their respective jurisdictions. Outside Helena: 1-800-462-1729 ; in Helena: 444-5648. Internet users can access drought data using the world-wide web viewer and address: http:/NRIS.MSL.MT.GOV

4) Develops new map products for use by the DAC in evaluating water supply and moisture conditions, such as the streamflow summary map which summarizes current USGS flow data and places it in the context of historical high, low, and average flows using hydrographs.

BUREAU OF MINES AND GEOLOGY
MONTANA SCHOOL OF MINERAL SCIENCE AND TECHNOLOGY

The Bureau of Mines and Geology supports the DAC's water supply monitoring activities through its statewide groundwater monitoring network. The network is used to determine general water use and water availability trends. The network will be used to monitor the effects of current and prolonged drought on aquifers. The data will identify aquifers particularly vulnerable to overdrafting during periods of drought and will be useful to determine the suitability of controlled groundwater district designation. Drought contingency planning for local water use could consider these data in regulating groundwater withdrawals.

Ongoing Activities

1) Serves as a member of the DAC in a data support capacity.

2) Monitors groundwater levels in aquifers statewide.

Drought Activity

1) Attends DAC monthly meetings and reports long and short-term changes in state's aquifers, by region, on a regular basis.

MONTANA STATE UNIVERSITY
STATE COOPERATIVE EXTENSION SERVICE

Through the state extension service, supplements, updates, and promotes educational and informational printed material on a variety of water conservation practices for agricultural and domestic users. Extension conducts research and development of agricultural methods on an ongoing basis on behalf of the state and its citizens.

Ongoing Activities

1) Conducts research and offers educational material for a variety of water conservation practices for agricultural and domestic users.

2) Conducts the "Grazing Initiative" program that includes strategies for grazing during periods of drought.

Drought Activity

1) With state Department of Agriculture, offers educational workshop for crop producers outlining strategies for coping with drought.

MONTANA CLIMATE CENTER

The state climate center at MSU collects soil moisture data from over 130 sites statewide for preparation of the PDSI map. The data are used by the Montana State Library's Natural Resource Information System to produce the color-coded PDSI map.

FEDERAL AGENCIES

Federal agencies provide several types of assistance to those adversely affected by drought. One type of assistance is access to the data agencies collect as part of their mission or mandate. The measurement, collection, and dissemination of hydrological and meteorological data forms the foundation of timely drought assessment. These data are used to assess and forecast water supply and moisture conditions. By comparing current with past data, planners and resource managers are better able to anticipate and plan for future drought impacts. Almost without exception, these services are provided on an ongoing basis.

Monetary and technical assistance are available for agricultural producers and business owners to mitigate losses related to drought. Technical assistance reduces the vulnerability of agricultural operations to drought. Some USDA assistance programs are ongoing and others require an official USDA Secretarial Natural Disaster Determination. The *Montana Drought Relief Assistance Reference Guide* lists federal and state assistance programs with brief descriptions of program benefits and eligibility requirements. The Guide is updated periodically and is available upon request.

BUREAU OF RECLAMATION
(U.S. Department of the Interior)

The mission of the Bureau of Reclamation (Reclamation) is to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public. Reclamation operates and maintains 13 major water storage reservoirs in the state. These projects provide water supplies for agricultural, municipal, industrial, and domestic uses. Hydropower, flood control, recreation, fish and wildlife protection, and navigation are additional benefits provided by Reclamation projects. Reclamation has developed new strategies to respond to society's increased emphasis on the protection of the west's natural resources. Reclamation's toll-free phone number for information regarding reservoir operations is 1-800-775-0868.

Ongoing Activities

1) In concert with states, tribes, water users, and others, develops staged drought management contingency plans and implements effective drought management measures and activities.

2) Works with other federal, state, and local agencies to enhance data collection and water supply forecasting capability to improve both water supply prediction and operational effectiveness.

3) Reviews operating criteria, strategies, and plans for Reclamation projects to determine if changes would make projects more effective in mitigating drought impacts.

4) Modifies project operations to minimize drought-related impacts. This includes operations that enhance water delivery to contractors but may also include actions to protect fish, wildlife, recreation, and other values.

5) Announces annual operating plans for project reservoirs based on established planning criteria. Seeks input from the public other parties such as marina and fishery managers to formulate plans.

6) Offers programs that assist irrigation districts in securing adequate supplies of water and installing facilities for water delivery and distribution.

7) Monitors and reports water supply conditions of Bureau of Reclamation projects.

8) Projects future water supplies based on indications such as mountain snowpack and irrigation water demand.

9) Coordinates project operations with the Bureau of Indian Affairs (BIA), irrigation districts, and other operators of diversion facilities. Reclamation meets with water managers to present water supply information, develop short-term operating plans, and suggest methods to extend available water supply.

10) Assesses the need for changes in policy to better accommodate drought problems and solutions.

11) Provides the public with informational and educational materials regarding water conservation. This includes water supply and forecast information for use by state and other federal agencies for drought assessment and management decision-making.

Drought Responses

1) Provides information and technical assistance on drought conditions and management programs and techniques to other federal and state agencies, tribes, water user organizations, and local entities.

2) Implements programs authorized and funded by Congress through emergency legislation. These programs include grants and loans for water-related projectsthat reduce the impacts of drought. These projects are coordinated with state, federal, and local authorities, and with water user organizations.

3) Evaluates drought-related conditions on all Reclamation projects and identifies recommended relief measures. Any time water supplies fail to allow an adequate supply, Reclamation seeks to identify, with its contractors, methods to extend the available water supply to reduce adverse economic impacts.

GEOLOGICAL SURVEY
(U.S. Department of the Interior)

The U.S. Geological Survey (USGS) supports the DAC with streamflow monitoring data on a continual basis. It also provides the DAC with monitoring data on groundwater levels. These data are used as an indicator of current and future surface water supplies. USGS operates a streamflow network of automated, real-time gauging stations that indicate natural streamflows, as well as streamflows influenced by irrigation and reservoir storage. These data provide the DAC with information useful in assessing future drought impacts. Internet system users can now access real-time streamflow data and historical data for a number of Montana rivers using the USGS home page. To access USGS real-time and historic streamflow data on the Internet world-wide web use the following address: http://wwwdmthln. cr.usgs.gov/. Historic streamflow data is available by county or by river basin.

Ongoing Activities

1) Measures and records streamflow data for most of the major rivers and streams of the state.

2) Compares current streamflow data with historical data to evaluate current conditions.

3) Conducts surface water investigations, primarily as a cooperator with state and local agencies on water supply projects. Determines water supply quality and evaluates hazardous conditions.

4) Maintains a data base of streamflow data on a real-time basis at the local level.

5) Conducts research on hydrologic processes and the effects of climate change.

Drought Response

Install and monitor streamflow gauges on river reaches of special concern during drought.

BUREAU OF LAND MANAGEMENT
(U.S. Department of the Interior)

Ongoing Activities

1) BLM manages public lands, including the authorization of livestock grazing, under the principles of multiple use and sustained yield; provides for the orderly administration of grazing by domestic livestock; and provides for the conservation and protection of rangeland soil and vegetation resources.

2) Maintains network of RAWS/ONMI soil moisture monitoring stations used in assessment of range conditions. Reports soil moisture levels to state DAC on a regular basis to supplement other sources of soil moisture assessment information.

Drought Responses

1) Manages range depletion during periods of drought by modifying grazing schedules and livestock management practices on BLM leased lands. This requires an increased level of coordination and consultation between livestock operators and BLM personnel.

2) Encourages voluntary adjustments in livestock use on public lands as it becomes apparent that normal grazing schedules under existing drought conditions would result in degradation of long-term resource productivity.

3) Where it is apparent that resource degradation may occur if drought continues, notifies livestock operators, through letters and news releases, that livestock grazing allotments may be reduced in the coming season.

4) Schedules range user meetings in affected communities to discuss possible actions to prevent range resource damage.

5) Develops strategies with livestock operators to minimize impacts to rangeland during and following drought.

6) Implements the procedure specified by federal statute 43 CFR 4160 if conditions warrant issuance of grazing restrictions. This procedure calls for a "proposed decision" made by the area manager and based upon an assessment of conditions of the subject allotment. Following a 15-day period for permittee protest, a final decision is rendered by the authorized officer. The permittee may appeal this decision.

NATIONAL WEATHER SERVICE
(U.S. Department of Commerce)

Ongoing Activities

1) Provides data support to the DAC as a non-voting member.

2) Produces hydrologic forecasts, including water supply forecasts for the state. Cooperates with the NRCS in the determination and production of water supply forecasts.

3) Produces short-term weather forecasts for the state. Longer range forecasts (6 to 10, 30 day, and 90 day) are produced by the Weather Service in Washington, D.C.

4) Collects and maintains meteorological records for weather stations around the state, including precipitation and temperature data. Produces reports that summarize state meteorological data.

5) Conducts climate analyses and produces weekly Palmer Drought Severity Index values and Crop Moisture Index values for seven regions of the state.

6) Maintains a phone service at the Climate Analysis Center in Maryland that includes databases where climate information can be accessed by the public.

NATURAL RESOURCE CONSERVATION SERVICE
(U.S. Department of Agriculture)

Ongoing Activities

1) Maintains remote SNOTEL system of automated telemetry sites which record and relay snowfall depth and snow water content information. Fully-automated sites provide "real time," data for users of the computer system operated by West National Technical Center in Portland, Oregon.

2) Reports SNOTEL Snow Precipitation Update mountain precipitation and snowpack information to DAC on a regular basis and provides comparisons to historical data.

3) Prepares monthly Surface Water Supply Index (SWSI) values for over 50 Montana river basins. SWSI is used by the DAC as an indicator of short-term (1 to 6 months) surface water supplies. See "Drought Monitoring" section of this plan for an explanation of SWSI. The SWSI indices are mapped by the state library using GIS and are part of the DNRC's monthly Water Supply and Moisture Report.

4) Produces the Montana Basin Outlook Report on a monthly basis which provides projected streamflow probabilities of major rivers and their tributaries for the coming month based on mountain snowpack and precipitation data from SNOTEL sites.

5) Monitors soil moisture conditions to determine water availability for plants.

6) Provides technical assistance to the agricultural community on matters such as farm conservation practices, water conservation, water quality improvement, and diversion of irrigation water.

CONSOLIDATED FARM SERVICE AGENCY
(U.S. Department of Agriculture)

Ongoing Activity

1) Provides ongoing agricultural programs to enhance water quality, improve water use efficiency, protect and preserve wetlands, and manage watersheds.

2) Offers direct and guaranteed loan programs as well as grants to the agricultural and business communities to increase economic opportunities, improve farming conditions, reduce pollution, improve community infrastructure, and provide disaster relief.

Drought Responses

1) Provides emergency grant programs during periods of drought to eligible producers suffering losses from natural disasters.

2) Provides guaranteed and insured loans to assist family farmers, ranchers, and aquaculture operators in recovering from losses resulting from natural disasters such as drought.

3) Serves as the chair of the State Emergency Board which reviews damage assessment reports prepared by local emergency boards. These reports are used in the determination of drought disaster status by the Secretary of Agriculture.

FEDERAL CROP INSURANCE CORPORATION

Provides insurance to farm owners and operators against unavoidable losses resulting from adverse conditions beyond the producers' control.

ARMY CORPS OF ENGINEERS
(U.S. Department of Defense)

Ongoing Activities

1) The Corps' responsibilities in water supply issues are primarily limited to hydropower production and flood control. Related issues in the operation of dams require the Corps to participate in other water management decisions.

2) Operates Fort Peck Dam and Reservoir on the Missouri River in northeast Montana and Libby Dam and its impoundment, Lake Koocanusa, on the Columbia River system in northwest Montana.

3) Operates federal reservoirs controlling releases of stored water for project purposes in periods of surplus runoff.

4) Prepares the Missouri River Annual Operating Plan and amends the Missouri River Master Manual, as needed, to improve the operation of all Corps projects on the Missouri River.

5) Controls navigation along the Missouri River by maintaining a navigable river channel for barge traffic, even at very low streamflows. This is facilitated through adjustments to upstream reservoir releases.

6) Administers the "404 Permit" section of the Federal Clean Water Act. The act applies to any person, agency, or entity, public or private, proposing a project that will result in the discharge of dredged or placement of fill material into waters of the United States. Applications are reviewed by the Corps prior to issuance of a permit.

7) Administers the Federal Rivers and Harbors Act which regulates any construction activity in or near, or alteration of any navigable water of the United States. Navigable waters in Montana are the Missouri River from Three Forks downstream to the Montana-North Dakota border, the Yellowstone River from Emigrant to its confluence with the Missouri River, and the Kootenai River from the Canadian border downstream to Jennings, Montana.

8) Conducts regional meetings to gather public comment and respond to local concerns and problems related to Corps projects, such as flat water recreation during periods of drought.

9) Controls river flows on the Missouri River system to meet requirements of municipal water supplies, hydropower production, recreation, endangered species, and irrigation in downstream states.

Drought Response

1) Constructs wells and transports water to farmers, ranchers, and political subdivisions within areas determined to be drought-distressed by the Chief of Engineers. Before Corps assistance is considered, other applicable federal assistance authorities must be evaluated. The authority for these actions is the Corps' responsibility under Public Law 84-99.

FEDERAL EMERGENCY MANAGEMENT AGENCY

Ongoing Activity

1) Provides grants to states for the suppression of forest and grassland fires.

Drought Responses

1) Provides disaster assistance to states, local governments, and nonprofit organizations when the President declares an emergency.

2) Provides disaster assistance including unemployment insurance, temporary housing, and crisis counseling to individuals and families adversely affected by disasters or emergencies.

SMALL BUSINESS ADMINISTRATION

Ongoing Activity

1) Provides advisory services, counseling, technical assistance and training to independently owned business to help improve management skills.

Drought Response

1) Administers the economic injury loan program for small businesses, including agricultural cooperatives, adversely affected by community agricultural losses. Businesses that depend on the business of agricultural producers affected by drought are eligible if an SBA disaster declaration is in effect in the state.

LOCAL ORGANIZATIONS

COOPERATIVE EXTENSION SERVICE

Ongoing Activities

1) Develops and disseminates drought-related agricultural and domestic information to established information networks.

2) Assesses availability of funds for long-term drought mitigation measures such as irrigation scheduling and other operation efficiency improvements.

3) Provides technical assistance to the agricultural community on how best to cope with drought conditions.

4) Conducts research into methods, practices, and crop species that might minimize impacts of droughts and disseminates the information as it is developed.

Drought Activity

1) Offers drought mitigation workshops with the state Department of Agriculture to provide crop producers with the latest information pertaining to their needs during drought.

COUNTY DISASTER AND EMERGENCY SERVICES

Ongoing Activities

1) Monitors local businesses, industries, and individuals to assess drought-related impacts.

2) Receives "flash reports" of agricultural difficulties from county emergency boards.

3) Gathers information on local drought-related needs.

4) Participates in the organization and activities of a local drought advisory committee.

5) Develops public service announcements for local broadcast concerning availability of assistance, water conservation measures, and meetings of local drought committees.

6) If necessary, prepares resolution or ordinance proclaiming local state of emergency to authorize emergency expenditures. Forwards the proclamation to state Disaster and Emergency Services (DES).

7) If necessary, assists officials in evaluating and verifying need for assistance from the U.S. Army Corps of Engineers.

COUNTY FOOD AND AGRICULTURAL COMMITTEE
(Emergency Board or FAC)

Drought Responses

1) Monitors local businesses, industries, and producers to assess drought-related impacts and record findings.

2) Prepares damage assessment reports detailing extent and nature of drought impacts and submits them to the local emergency management agency and the state emergency board. (The state board reports to the governor and forwards data to the Secretary of Agriculture.)

LOCAL DROUGHT ADVISORY COMMITTEES

LDACs assume a key role in mitigation of drought impacts. Over 30 counties have convened committees to exchange information and plan responses to drought. An ideal LDAC includes participants from a wide variety of backgrounds and professions. LDAC's should initiate activity early enough to anticipate and respond to drought before economic and resource damage occurs.

LDACs serve as linkage for exchange of information between the DAC and counties. Some counties have monthly LDAC meetings starting in early spring to monitor and report local conditions. In most cases, LDACs meet if drought is imminent or ongoing. The Appendix contains a local drought operations manual for organization of local drought management efforts.

Drought Responses
Alert

1) Convene drought-affected groups and individuals to identify and discuss the nature and extent of local drought impacts.

2) Refer to local drought operations manual (see Appendix) for direction and ideas for local drought management strategies.

3) Disseminate information gathered by state agencies concerning conditions and forecasts and availability of assistance to the locality.

4) Develop strategies to address local drought impacts using local resources and expertise. For example, local federal agency offices, such as NRCS, offer technical assistance for water delivery efficiency of agricultural operations.

5) Communicate local conditions and needs to the DAC to reconcile data gathered by state and federal agencies.

Severe Drought

1) Report impact assessments to county commissioners and the DAC. If conditions warrant, the commissioners will forward a request to the governor to initiate the natural disaster determination process (flow chart of process is included in Appendix E).

CITY/COUNTY PLANNING OFFICES

Ongoing Activities

1) County sanitarians administer septic system regulations which apply to anyone proposing to construct, alter, extend, or operate a sewage treatment and disposal system. Conventional systems must be at least 100 feet from the 100-year floodplain and 6 feet from groundwater. Alternative designs that are 4 to 6 feet from groundwater must be approved.

2) Administer Lakeshore Protection Act which applies to all private individuals and government entities proposing to do work in or near a body of water within a county's jurisdictional area.

3) Promote the practice of xeriscaping by recommending drought-resistant plant and tree varieties for landscaping requirements of local zoning ordinances.

4) Assist in the drafting and implementation of local water conservation ordinances.